Defense Sciences Office

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DARPA's Mission

Breakthrough Technologies for National Security

Precision Guidance & Navigation

Communications/Networking **IR Night Vision**

Stealth **Radar Arrays** **UAVs**

1960s	1970s	1980s	1990s	2000s	2010s

Microelectronics: VLSI, CAD, manufacturing, IR, RF, MEMS

ARPAnet/Internet

Information Technology: timesharing, client/server, graphics, GUI, RISC, speech recognition

Materials Science: semiconductors, superalloys, carbon fibers, composites, thermoelectrics, ceramics

New capabilities require a healthy ecosystem across Service S&T, universities, and industry

DARPA's role: pivotal early investments that change what's possible

DARPA Technical Offices

BTO — BIOLOGICAL TECHNOLOGIES OFFICE

- Biological Complexity at Scale
- Neurotechnologies
- Engineering Biology
- Restore, Maintain and Improve Warfighter Abilities

DSO — DEFENSE SCIENCES OFFICE

- Math, Modeling & Design
- Physical Systems
- Human-Machine Systems
- Social Systems

I2O — INFORMATION INNOVATION OFFICE

- Empower the Human within the Information Ecosystem
- Guarantee Trustworthy Computing and Information

MTO — MICROSYSTEMS TECHNOLOGY OFFICE

- Electromagnetic Spectrum
- Tactical Information Extraction
- Globalization

STO — STRATEGIC TECHNOLOGY OFFICE

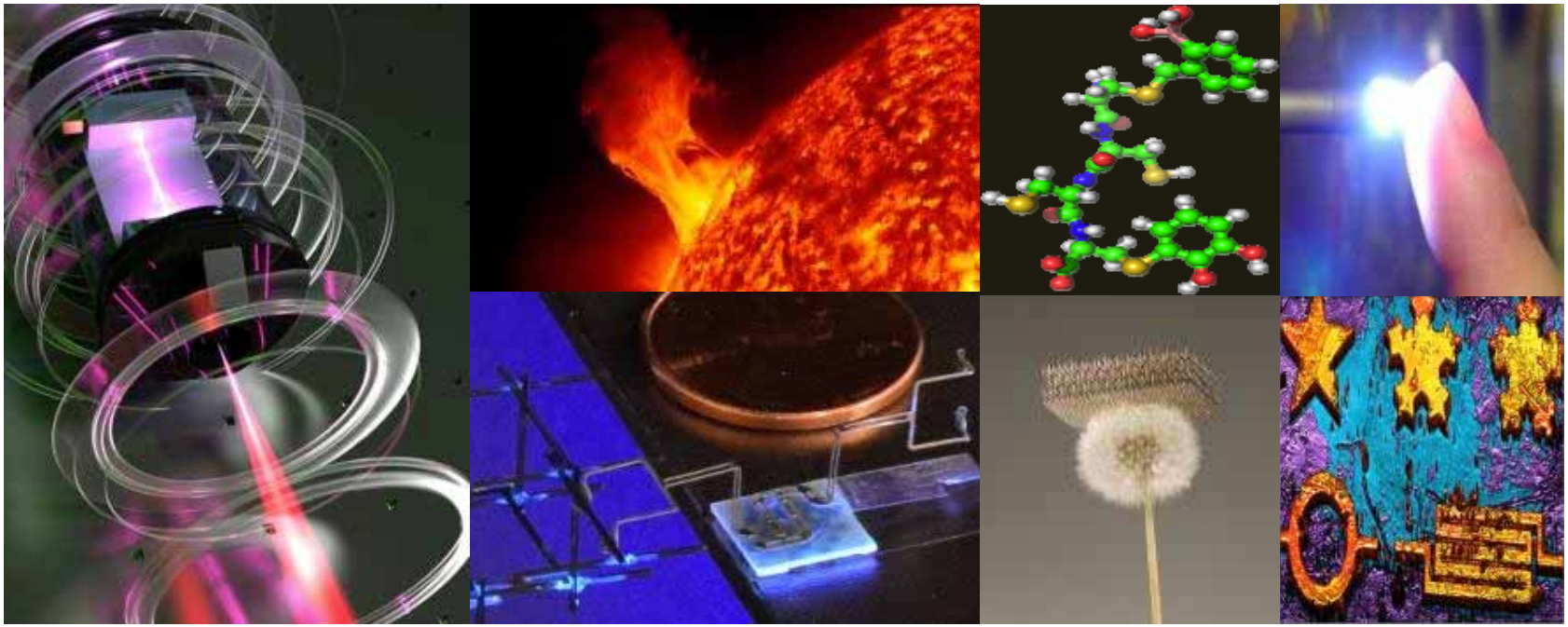
- System of Systems (SoS)
- Battle Management/Command and Control (BMC2)
- Communications and Networks (C&N)
- Electronic Warfare (EW)
- Intelligence Surveillance, and Reconnaissance (ISR)
- Positioning, Navigation, and Timing (PNT)

TTO — TACTICAL TECHNOLOGY OFFICE

System Focus Areas:
- Ground
- Maritime
- Air
- Space

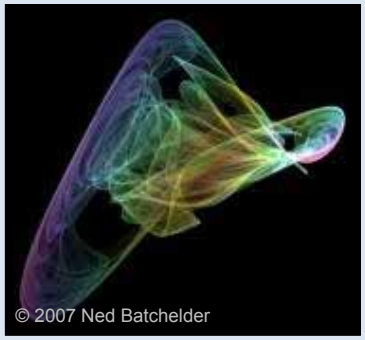
Crosscutting Themes:
- Agile development
- Cooperative Autonomy
- Unmanned Systems
- Power and Propulsion

DSO is "DARPA's DARPA"



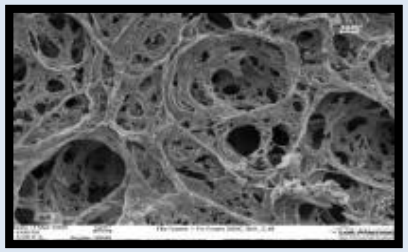
Accelerating breakthrough discoveries to create new enabling technologies for national security

Focus Areas



Math, Modeling & Design

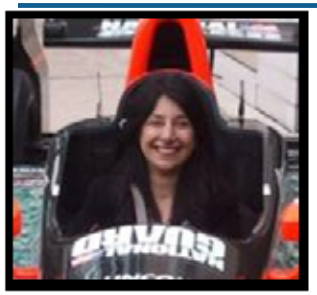
Physical Systems



Human-Machine Systems

Social Systems

Program Managers



Fariba Fahroo
Mathematics

Michael Maher
Materials & Manufacturing

James Gimlett
Physics

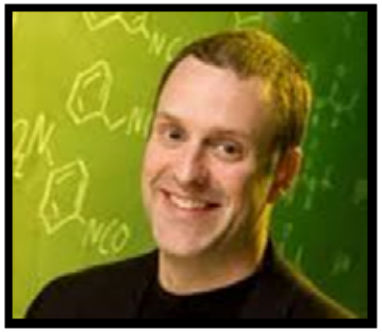
Jan Vandenbrande
Math, Design, & Production Automation

John Paschkewitz
Systems, Design, & Materials

John Main
Material System Innovation

Prem Kumar
Quantum & Nonlinear Optics

Adam Russell
Behavioral/Social Sciences



Tyler McQuade
Chemistry

Predrag Milojkovic
Imaging & Optics

Reza Ghanadan
Complexity Science

Vincent Tang
Applied Physics

DSO Contributions to Manufacturing Science

Carbon/Aluminum Composite Fan Blades

Explosive forming
Rapid Solidification
Metal Matrix Composite

High Performance Gyroscopes

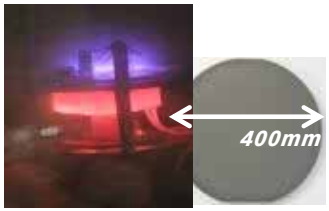
Ceramic Bearings

Ceramic Armor

Lightweight Armor for Vehicles

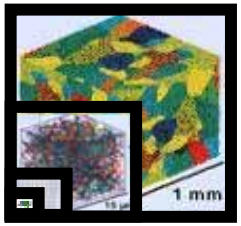
Intelligent Processing of Materials

CVD Diamond



Low Cost Ti

Engineering Design Processing



Accelerated Insertion of Materials

Advanced Structural Fiber

Corrosion/ Erosion Resistant Surfaces

Low Temp Colossal Supersaturation

1958 | 1990 | 1995 | 2000 | 2005 | 2010 | 2015

DARPA Initiative in Concurrent Engineering (DICE)

Agile Manufacturing

Focus HOPE

Integrated Nano-to-Millimeter Assembly Technologies (In2m)

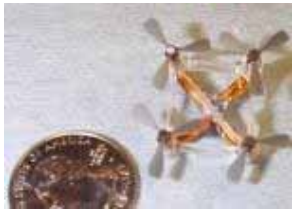
Rapid Design Exploration and Optimization (RaDEO)

Solid Freeform Fab

Open Manufacturing (OM)

Manufacturing Automation and Design Engineering (MADE)

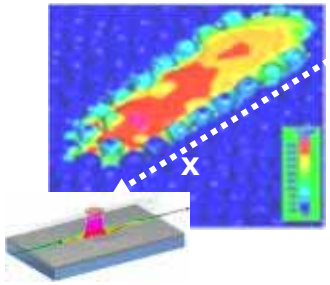
Affordable Multi-Missile Manufacturing (AM3)



Mesicopter Built by Layered Assembly

Generative Design for Hydraulic Tubing

Ceramic Hot Gas filters



Powder Bed Model Predicts Melt Pool Behavior

We look forward to your ideas